CLAIM AMENDMENTS

IN THE CLAIMS

This listing of the claims will replace all prior versions, and listing, of claims in the application or previous response to office action:

1. **(Currently Amended)** A touchframe system for determining the position of a touch event within a display area, said system comprising:

a plurality of light emitting elements positioned around the perimeter of the display area;

a plurality of light receiving elements~~, each of the light receiving elements~~ in combination with ~~a plurality of~~ the light emitting elements forming a **plurality of triangular zones** ~~zone~~ of light beam paths **including:**

a first triangular zone and a second triangular zone partially overlapping with the first triangular zone to define a first overlap region; and

a third triangular zone and a fourth triangular zone partially overlapping with the third triangular zone to define a second overlap region, the second overlap region at least partially overlapping with the first overlap region; and

~~, the number and positioning of receivers being sufficient to form partially overlapping zone pairs such that~~

wherein the touch event lies within at least **the first overlap region and the second overlap region** ~~two partially overlapping zone pairs~~; and

a processor programmed to:

monitor each of the zone pairs for blockage of at least one light beam path; and

upon such blockage, calculate the location of the touch event associated with the blockage based on the slopes and end points of at least ~~two~~ **one** ~~intersecting~~ blocked light beam **path in each of the first, second, third, and fourth triangular zones** ~~paths from a first zone pair and two intersecting blocked light beam paths from a second zone pair~~.

2. **(Currently Amended)** The system of claim 1 wherein the processor monitors each of the **triangular zones** ~~**zone pairs**~~ for blockage by being programmed to:

randomly activate the light emitting elements, one at a time; and

monitor the output of each light receiving element associated with the activated light emitting element for an output indicative of a blocked light beam path.

3. (Original) The system of claim 2 wherein the processor is further programmed to activate the light emitting elements at pseudo random intervals.

4. (Original) The system of claim 2 wherein the processor is further programmed to activate the light emitting elements in a pseudo random sequence.

5. (Original) The system of claim 2 wherein the light receiving element outputs a signal having a pulse edge upon receipt of light and the processor is programmed to tag a light beam as blocked in the absence of a pulse edge in the light receiving element output.

6. **(Currently Amended)** The system of claim 1 wherein the processor is programmed to ~~**selected**~~ **select** the first and second **triangular zones, and the third and fourth triangular zones,** ~~**zone pairs**~~ based on the angles formed by the intersecting light beam paths.

7. (Original) The system of claim 6 wherein the processor is further programmed to select those zones pairs having the most orthogonal angles.

8. (Original) The system of claim 1 wherein the processor is programmed such that, when the touch event blocks an odd plurality of light beam paths within a zone, touch event location calculation is done using the center blocked light beam path.

9. (Original) The system of claim 1 wherein the processor is programmed such that, when the touch event blocks an even plurality of light beam paths within a zone, touch event location calculation is done using a virtual beam located between the two central blocked light beam paths.

10. **(Currently Amended)** A method of determining the location of a touch event within a display area surrounded by a touch frame having a plurality of light emitting elements and a plurality of light receiving elements forming a plurality of **triangular** zones of light beam paths, **each triangular zone being defined by a light receiving element and a plurality of light receiving elements,** the number and positioning of receivers being sufficient to form partially overlapping zone pairs such that the touch event lies within at least two zone pairs, said method comprising:

monitoring each of the zone pairs for blockage of at least one light beam path; and

upon such blockage, calculating the location of the touch event associated with the blockage based on the slopes and end points of at least two intersecting blocked light beam paths from a first zone pair and two intersecting blocked light beam paths from a second zone pair.

11. (Original) The method of claim 10 wherein monitoring each of the zone pairs for blockage of at least one light beam path comprises:

randomly activating the light emitting elements, one at a time; and

monitoring the output of each light receiving element associated with the activated light emitting element for an output indicative of a blocked light beam path.

12. (Original) The system of claim 11 wherein the light emitting elements are activated at pseudo random intervals.

13. (Original) The system of claim 11 wherein the light emitting elements are activated in a pseudo random sequence.

14. **(Currently Amended)** A touchframe system comprising:

a plurality of opposed perimeter sections;

a plurality of triangular zones, each including a row of **at least three** light emitting elements positioned along one of the perimeter sections and an associated light receiving element positioned along the perimeter section opposite the light emitting elements, **each of the at least three light emitting elements in a particular row of light emitting elements being aimed at a midpoint between (a) the light receiving element associated with the particular row of light emitting elements and (b) another light receiving element,** each of the light emitting elements and associated light receiving element defining a light beam path;

a memory device having stored therein the slopes and end points of each light beam path within each of the plurality of triangular zones; and

a processor programmed to:

randomly activate the light emitting elements, one at a time;

monitor the output of each light receiving element associated with the activated light emitting element for blockage of a light beam path; and

upon such blockage, calculate the location of the source of blockage based on the slopes and end points of at least two intersecting blocked light-beam paths.

15. (Original) The system of claim 14 wherein each row of light emitting elements has two associated light receiving elements positioned such that the two triangular zones formed by the light emitting elements partially overlap.

16. (Original) The system of claim 15 wherein the light receiving elements have an associated acceptance angle and the light emitting elements have an associated angle of light dispersion and the elements are arranged relative each other such that the center of the acceptance angle of each receivers is directed toward the center of the row of light emitting elements and the center of the angle of dispersion of each light emitting element is directed toward a point midway between the two receivers.

17. (Original) The system of claim 14 wherein the location of the light receiving element defines the end points of the light beam paths.

18. (Original) The system of claim 14 wherein the processor is further programmed to activate the light emitting elements at pseudo random intervals.

19. (Original) The system of claim 14 wherein the processor is further programmed to activate the light emitting elements in a pseudo random sequence.

20. (Original) The system of claim 14 wherein the processor is programmed to inspect at least one orthogonal pair of triangular zones associated with the source of blockage for the two intersecting light beam paths.

21. (Original) The system of claim 14 wherein the processor monitors the output of each light receiving element associated with the activated light emitting element for blockage of a light beam path by being programmed to:

compare the profile of the output to an expected profile having a time-based noise threshold;

identify a light beam as noise if there is a pulse edge in the profile prior to the noise threshold;

identify a light beam as connected if there is a pulse edge in the profile after the noise threshold; and

identify all other light beams as blocked.

22. (Original) The system of claim 21 wherein the time-based noise threshold is defined by the response time of the light receiving element.

23. (Original) The system of claim 21 wherein the processor comprises a state counter for counting the identification of a light beam over successive triggers of the light emitting element associated with the light beam and outputting a confirmed blocked or connect identification after the counter has reached a specified value.

24. (Original) The system of claim 23 wherein the specified value is at least two successive triggers of the associated light emitting element.

25. **(Currently Amended)** A method of determining the location of a touch event within a display area surrounded by a touch frame having a plurality of light emitting elements and a plurality of light receiving elements forming a plurality of triangular zones of light beam paths each having a slope and endpoints, the number and positioning of receivers being sufficient to form partially overlapping **triangular zones such that the touch event is fully located within each of at least four triangular zones** ~~**zone pairs**~~, said method comprising:

for each of the plurality of triangular zones, storing the slopes and end points of each light beam path;

randomly activating the light emitting elements, one at a time;

monitoring the output of each light receiving element associated with the activated light emitting element for blockage of a light beam path; and

upon such blockage, calculating the location of the source of blockage based on the slopes and end points of at least two intersecting blocked light-beam paths.

26. (Original) The method of claim 25 wherein monitoring the output of each light receiving element associated with the activated light emitting element for blockage of a light beam path comprises:

comparing the profile of the output to an expected profile having a time-based noise threshold;

identifying a light beam as noise if there is a pulse edge in the profile prior to the noise threshold;

identifying a light beam as connected if there is a pulse edge in the profile after the noise threshold; and

identifying all other light beams as blocked.

27. (Original) The method of claim 26 wherein the time-based noise threshold is defined by the response time of the light receiving element.

28. (Original) The method of claim 26 wherein identifying a light beam as connected or blocked comprises: counting the identification of a light beam over successive triggers of the light emitting element associated with the light beam; and outputting a confirmed blocked or connect identification after the counter has reached a specified value.

29. (Original) The method of claim 28 wherein the specified value is at least two successive triggers of the associated light emitting element.

30. **(Currently Amended)** A touchframe system for determining the position of a touch event within a display area, said system comprising:

a plurality of light emitting elements positioned around the perimeter of the display area;

a plurality of light receiving elements, each of the light receiving elements in combination with a plurality of the light emitting elements forming a zone of light beam paths, the number and positioning of receivers being sufficient to form partially overlapping **triangular** zone pairs such that the touch event lies **fully** within at least ~~one~~ **two** partially overlapping **triangular** zone **pairs** ~~pair~~; and

a processor programmed to:

randomly activate the light emitting elements, one at a time;

monitor the output of each light receiving element associated with the activated light emitting element for blockage of a light beam path; and

upon such blockage, calculate the location of the touch event associated with the blockage based on the slopes and end points of ~~at least two~~ intersecting blocked light-beam paths **from each of the at least two partially overlapping triangular zone pairs**.

31. (Original) The system of claim 30 further comprising a memory device having stored therein the slopes and end points of each light beam path within each of the zones

32. **Cancelled.**

33. **(Currently Amended)** The system of claim 32 wherein the processor is programmed to calculate the location of the touch event using the most orthogonally overlapping **triangular** zone pairs.

34. (Original) The system of claim 32 wherein the processor is programmed to:

individually calculate a location of the touch event for each pair of intersecting blocked light-beam paths; and

average the individual results to obtain the location of the touch event.

35. **(Currently Amended)** The system of claim 32 wherein ~~**the zones are**~~ **each zone in each triangular zone pair is** triangular with a row of light emitting elements forming one side of the triangle and one light receiving element forming an apex opposite the row of light emitting elements.